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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Igor Lubomirsky

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EXAMINER

NGUYEN, KHANH TUAN

ART UNIT

PAPER NUMBER

1766

MAIL DATE

DELIVERY MODE

01/31/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/560,107	LUBOMIRSKY, IGOR	
	Examiner	Art Unit	
	KHANH T. NGUYEN	1766	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20, 24-30 and 38-43 is/are pending in the application.
- 4a) Of the above claim(s) 2,3,6 and 38-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,7-20,24-30 and 41-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed on 11/12/2010 is entered and acknowledged by the examiner. Claims 1-13, 15-20, 25, 26, 29-35, 38, 40 and 41 are amended. New claims 42 and 43 are added. Claims 21-23, 36 and 37 are cancelled. Claims 2, 3, 6, and 38-40 were previously withdrawn. Claims 1, 4, 5, 7-20, 24-35 and 40-43 are currently pending in the instant application.

2. The rejection of claims 1, 4, 5, 7-20, 24-30 and 41 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Pat. 4,342,648 (MacKenzie) is maintained for the reason of record (and reproduced below).

3. The rejection of claims 31-35 under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. 4,342,648 (MacKenzie) is maintained for the reason of record (and reproduced below).

(Previously Rejected)

Claim Rejections - 35 USC § 102/013

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4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. **Claims 1, 4, 5, 7-20, 24-30 and 41-43 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Pat. 4,342,648 (MacKenzie).**

With respect to claims 1, 5-20, 24 and 41-43, MacKenzie discloses a method for forming amorphous ferroelectric material (See Title). The amorphous ferroelectric material including LiNbO_3 , $\text{Pb}(\text{Zr},\text{Ti})\text{O}_3$, $(\text{Pb},\text{La})(\text{Zr},\text{Ti})\text{O}_3$, $\text{PB}(\text{Zr}_x\text{T}_{(1-x)})\text{O}_3$ wherein $x = 0$ to 1, and BaTiO_3 (Col. 3, lines 10-25; Col. 7, lines 2-3; Col. 8, lines 30-40). The amorphous ferroelectric material of MacKenzie, e.g. amorphous BaTiO_3 and $(\text{Pb},\text{La})(\text{Zr},\text{Ti})\text{O}_3$, is structurally same as the claimed oxide compound of formula $(\text{A}_x\text{B}_{1-x})_p\text{O}_n$ and $(\text{A}_x\text{B}_{1-x})(\text{C}_y\text{D}_{1-y})\text{O}_n$, respectively, as recited in **claims 5-14, 17, 19 and 20**. The amorphous ferroelectric material of MacKenzie is a non-crystalline ionic solid as recited in **claims 41-43** (Col. 8, lines 35-36). The amorphous ferroelectric material of MacKenzie is a quasi-amorphous compound as described by the applicant (See Page 5 of the Specification). MacKenzie further discloses the amorphous ferroelectric material having pyroelectric coefficient as recited in claims 15, 16 and 18 (See Fig. 2; Col. 8, lines 24-26).

The limitations of "said pyroelectric compound being a product of application of a mechanical strain to a substantially amorphous compound" and "said mechanical strain being controlled so as to prevent crystallization of said compound" are product-by-process limitations and are not limited to the manipulations of the recited steps, only the structure limited by the steps. Therefore, the patentability of the product does not depend on its method of production and the claimed steps were not given patentable weight. Nonetheless, MacKenzie discloses the amorphous ferroelectric material subjected to mechanical strain such as poling and electric field (Col. 8, lines 21-26; Col. 11, lines 59-63) which provide a quasi-amorphous compound with pyroelectricity as described by the applicant (See Page 4 lines 19-23 and Page 8 lines 24-25 of the Specification). Thus, one skilled on the art would have had a reasonable expectation that the amorphous ferroelectric material of MacKenzie would have a quasi-amorphous morphology and piezoelectric properties as recited in **claims 1 and 24**.

The reference specifically or inherently meets each of the claimed limitations. The reference is anticipatory.

Any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made because where the

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examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to the applicant to establish that their product is patentably distinct, not the examiner to show the same process of making, see *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324.

Regarding **claim 25-27 and 29-30**, MacKenzie discloses the material can be deposited on a silicon surface and is useful in a broad variety of electronic opto-electronic and optical devices (Col. 11, lines 24-41).

Regarding **claim 28**, MacKenzie discloses the material having a coating thickness of 1600 angstroms, i.e. equivalence to 0.16 microns, as required by the instant claim (Col. 10, lines 55-67).

6. Claims 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. 4,342,648 (MacKenzie).

Mori is relied upon as set forth above. With respect to instant claims, MacKenzie discloses an amorphous ferroelectric material that is useful in a broad variety of electronic opto-electronic and optical devices (Col. 11, lines 24-41), but failed to expressly suggest using the amorphous ferroelectric material in specific devices as claimed.

However, it would have been obvious to a skilled artisan to use the amorphous ferroelectric material of MacKenzie in the claimed devices since devices containing oxide compounds such as BaTiO_3 , as claimed, are known in the art at the time the invention. Thus, it is a *prima facie* obvious to use a known material in the devices as claimed.

Thus, it would have been obvious for a skilled artisan use the amorphous ferroelectric material of MacKenzie in a device as claimed and the result would have been predictable.

Response to Arguments

7. Applicant's arguments filed on 11/12/2010 have been fully considered but they are not persuasive.

In response to the applicant's remark, applicant argues that the presently claimed quasi-amorphous compounds, are not the same as the compounds disclosed in MacKenzie. The present specification, at page 4, lines 1-3, defines quasi amorphous compounds as compounds which are non-crystalline ionic solids having a macroscopic polarization. The pyroelectric properties are imparted to the compounds by applying a mechanical strain, such as a steep temperature gradient or an electric field, to the substantially amorphous compounds. While the compounds

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before such treatment are substantially amorphous, the mechanical strain imparted to the compounds creates macroscopic polarization within the compounds, while preventing the formation of crystals. This polarization produces the pyroelectric properties, thus making the compounds quasi-amorphous. The process to which the amorphous compounds are subjected causes them to be quasi-amorphous, and thus different from the original amorphous compounds.

Initially, the examiner would like to point out that MacKenzie discloses the same or substantially same amorphous compound as described by the applicant, i.e. LiNbO_3 , $\text{Pb}(\text{Zr},\text{Ti})\text{O}_3$, $(\text{Pb},\text{La})(\text{Zr},\text{Ti})\text{O}_3$, $\text{Pb}(\text{Zr}_x\text{Ti}_{(1-x)})\text{O}_3$ wherein $x = 0$ to 1 (See Col. 3, lines 10-25; Col. 7, lines 2-3; and Col. 8, lines 30-40).

Additionally, "even though product-by-process claims are limited by and defined by the process (i.e. applying a mechanical strain to the compound to impart macroscopic polarization while preventing the formation of crystals to produce a quasi-amorphous compound), determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production as argued. It has been held that if the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior

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product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). "The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. *In re Fessmann*, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir.1983). Moreover, a person having an ordinary skill in the art would have a reasonable expectation that the amorphous compound of MacKenzie would form a quasi-amorphous compound when subjected to mechanical strain to impart macroscopic polarization while preventing the formation of crystals because the amorphous compounds of MacKenzie, i.e. LiNbO_3 , $\text{Pb}(\text{Zr,Ti})\text{O}_3$, $(\text{Pb,L a})(\text{Zr,Ti})\text{O}_3$, $\text{Pb}(\text{Zr}_x\text{Ti}_{(1-x)})\text{O}_3$ wherein $x = 0$ to 1, are structurally same or substantially same as the amorphous compound described by the applicant. Hence, MacKenzie anticipates the claims.

Based on the above rational, it is believed that the claimed limitations are met by the reference submitted and therefore, the rejections are maintained.

Applicant is invited to contact the undersigned examiner in order to discuss possible ways of overcoming the above rejection(s).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHANH T.

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NGUYEN whose telephone number is (571)272-8082. The examiner can normally be reached on Monday-Thursday 7:00-6:00 EST PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Kopec/
Primary Examiner, Art Unit
1761

/K. T. N./
Examiner, Art Unit 1766

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